

***INTEREST RATE POLICY AND ITS IMPLICATION ON
THE BANKING RESTRUCTURING PROGRAMS IN
INDONESIA DURING THE 1997-FINANCIAL CRISIS:
AN EMPIRICAL INVESTIGATION.***

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**Interest Rate Policy and Its Implication on the Banking
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during the 1997-financial crisis: An Empirical Investigation.**

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Abstract:

Despite a number of changes in the leaderships of the Indonesian Bank Restructuring Agency (IBRA) and in the policy approaches adopted by the country to restructure the banking sector, the progress has been less than impressive. This study shows that the selection of policy measures adopted by the monetary authorities during the post-1997 financial crisis, has adversely affected the performance of the restructured banks. In particular, the high domestic interest rate policy adopted to stabilize the local currency and to keep a tight growth of base money has not been an effective one. Instead, this policy has arguably raised the cost of bank restructuring in the country.

JEL Classification: E51, E52, E58, F31

Key Words: Financial Crisis, Bank Restructuring, Interest Rate, Base Money, Exchange Rate.

1. Introduction

The impact of the 1997 financial crisis on the economic activities of the East Asian economies proved to be considerably more severe than expected, both reflecting and revealing weaknesses in domestic financial and corporate institutions, and inappropriate government policies. Output in the most affected economies of Southeast Asia fell by more than 6 percent in 1998 (Figure 1). At the outset of the crisis, external borrowings, particularly by the private sector, have often been cited as one of the key factors responsible for the severity of the recent crisis (Bhagwati (1998), Corsetti, Pesenti and Roubini (1999), Rajan and Siregar (2002) and Kawai (2002)). In Indonesia, corporations were the principle borrowers from foreign sources, while in South Korea, banks were the primary borrowers from the external markets.

Despite the varieties in the patterns of borrowings among the crisis effected economies in East Asia, the combination of rigid exchange rate policies and high domestic interest rate policy was inarguably an important factor for massive offshore borrowings by the domestic financial institutions, particularly in late 1980s and early 1990s. The predominantly US dollar-pegged policy in East Asia was considered as an implicit government guarantee that there will be no sharp changes in the nominal exchange rate of the local currencies against the US dollar. Given the low risk premium in the foreign exchange market, the higher returns from the domestic bank deposits had led to an increase in deposits from non-residents and the countries' citizens based overseas. Krugman (1998) points out further that the implicit guarantees on the exchange rate level and poor regulation on the financial and corporate institutions encourage the "Pangloss" investments.¹

To deal with the economic crisis, a number of recovering programs have been drafted and signed jointly by the government of Indonesia and the International

¹ Pangloss investment are those that are undertaken based on th returns under ideal circumstances, not on the actual project's expected returns.

Monetary Fund (the IMF) since late 1997.² As expected, restructuring the banking sector is among the most urgent challenges facing Indonesia during the post-1997 crisis. Despite the developments of other financial institutions, such as the capital market and the non-banking financial institutions, the dependence of the private sector on the domestic banking sector has always been very high in the country (Pangestu and Habir (2002)). Most firms, particular small and medium-sized enterprises, continue to rely on the domestic financial institutions. To oversee the restructuring programs of the banking sector, the Indonesian Banking Restructuring Agency (IBRA) was established in January of 1998.

Other cornerstones of the agreements between the IMF and the government of Indonesia include efforts to stabilize the domestic currency and to adopt a tight monetary policy (Soesastro and Basri (1998) and Johnston (1998)). These two programs are recognized to be particularly critical to deal with inflationary pressures in the country during the crisis period (Siregar and Rajaguru (2002)). The tight monetary policy program specifically requires the government of Indonesia to limit the growth rate of its broad monetary aggregate (M2), to be achieved through controlling base money (M0) quarterly growths. Given the limited choices of monetary policy instruments, the central bank of Indonesia has largely resorted to a high interest rate policy to achieve those targets of stable rupiah and base money during most of the post-crisis period.

However, despite a number of changes in the leaderships of the IBRA and in the policy approaches adopted by the country to restructure the banking sector, the progress has been less than impressive.³ In its recent report on Indonesia, IMF (2002) underscores four key factors that explain the low asset recovery rates under

² The first three Letters of Intents (LOIs) between the government of Indonesia and the International Monetary Fund were signed in October 1997, January 1998 and March 1998.

³ As of the end 2001, IBRA's chairmanship has been changed at least seven times since its establishment in 1998.

the management of the IBRA: (a) the high degree of impairment of transferred non-performing loan assets; (b) overvaluation of pledged shareholder assets when originally transferred to IBRA; (c) weaker conditions in Indonesia's financial and property markets than originally anticipated; and (d) depreciation of assets since they were transferred to IBRA, in part due to poor management of these assets by IBRA. The report also stresses the fact that the IBRA has had only limited success in enforcing its claims through the courts or by using its quasi-judicial powers. By end of 2001, IBRA had processed 2,400 litigation cases, of which 2,125 cases were through civil courts while 68 cases were brought to the bankruptcy court. Of the total, only 230 were settled as of end 2001, with IBRA mostly on the losing side (IMF (2002)).⁴

In addition to those key factors above, this study will show that the selection of policy measures adopted by the monetary authorities during the post-1997 financial crisis, has also adversely affected the performance of the restructured banks, and thus further deteriorated the face values of the assets. In particular, we will show that the high domestic interest rate policy adopted to stabilize the local currency and to keep a tight growth of base money has not been an effective measure. Instead, this policy has arguably worsened the environment for reforms and raised the cost of the banking restructuring.

The outline of the paper is as follows. Next section will briefly highlight the high cost of bank restructuring in Indonesia. Section three discusses and analyses recent trends and policy debates on the three key monetary indicators (the domestic interest rate, the nominal exchange rate of rupiah against the US dollar and the base money). Empirics are presented in section four to investigate the effectiveness of the interest rate policy in achieving its objectives of stable rupiah and base money.

⁴ For cases brought by IBRA against Top 21 obligors, as of mid-February 2002, IBRA had won 7 out of 25 of the cases in bankruptcy court, and none of the four cases in civil court (IMF (2002, pg.42).

Section five presents evidences of adverse consequences of the interest rate policy on selected performance indicators of the restructured banks. Brief concluding remarks end the paper.

2. Brief Notes on Financing Bank Restructuring in Indonesia⁵

By the end of 2001, IBRA was reported to have received assets (of restructured banks) with a face value of roughly Rp550 trillion, or around 43 percent of the country's GDP in 2000 (IMF (2002)). Receipts from the management and disposal of the assets sales will help to offset the 703 trillion rupiah (55 percent of the GDP in 2000) in public sector debt issued towards recapitalising Indonesia's banks.

Out of this total amount of domestic bond issued, approximately Rp435 trillion is in the form of bank recapitalisation bonds (Table 1). Roughly around 65 percent of the total recapitalised bonds are spent to deal with bad loans in the state banks. While only about 4 percent was channelled to the private banks. Furthermore, it is important to note that almost 70 percent of the total recapitalised bonds were disbursed into 11 main domestic banks (4 state banks and 7 private banks) (Table 1b).

In addition to financing the bonds, the government of Indonesia had also committed itself to provide "a blanket guarantee" on all deposits and liabilities of national banks (other than shareholders' funds and subordinated debt) for an initial period of two years in January 27, 1998. This measure had to be taken to deal with depositor panic and international banks not accepting letters of credits issued by

⁵ Numerous studies and reports have highlighted the details of the restructuring processes of the banking sector in Indonesia, such as Johnson (1998), McLeod (2000), Enoch *et.al.* (1999), and Pangestu and Habir (2002) to name a few. Given those early studies, this section will only summarize few key policies. The objective of this section is to highlight the heavy cost of the restructuring programs undertaken by the country.

Indonesian banks. The provision of this high cost policy however went beyond the initial two years target. Only in August 2002, the government revealed its plan to phase out the blanket guarantees (Table 2). According to the plan, the first stage of implementation will be effective in the middle of 2003, six months after its formal announcement of the target start date.

3. Base Money, Exchange Rate and Interest Rate

3.1. Base Money

On November 1, 1997, the day after the first IMF agreement was signed, the government of Indonesia announced the liquidation of 16 banks. Although the decision had already been foreshadowed, it created shock waves that resulted in a total loss of confidence in the banking system (Soesastro and Basri (1998)). One of the aftermaths of the closure of the banks was the rise in the levels of monetary aggregates during the last few months of 1997 and first seven months of 1998. The expansion reflected the liquidity support provided to troubled banks and the impact of depositor runs on banks. The consequence of the banking sector bailouts prompted an increasing use of seigniorage, and would eventually require infusions of liquidity to prevent systemic runs.

Within a month after the announcement of the closures of the 16 banks, the level of base money has grown by more than 36%. By the end of July 1998, the base money had experienced an unprecedented increase of more than 115% from its level in November 1997 (Figure 2). For the sake of comparison, between 1991 and 1996, the annual growth rate of base money in Indonesia had been averaging only around 25%, with the highest growth in 1996 at 38% and the lowest in 1991 at around 15%.

3.2. Rupiah: To Float or Not To Float

In August 1997, the monetary authority of Indonesia floated rupiah and immediately the Indonesian currency experienced around 16.8% depreciation against the US dollar (Figure 3). However, the worst fall occurred only in the first six months of 1998. Right after being floated in August 1997, the nominal exchange rate was at Rp3,035 per 1US dollar. By June1998, the local currency was traded at 1US dollar for Rp14,900. Corsetti *et.al* (1999) argue that the nominal depreciations of Asian currencies in 1997 were in fact consistent with the expected inflationary consequences of banking and financial bailouts.

In addition to the massive depreciations, the uncertainties and the volatilities of rupiah had further worsened the economic condition during the crisis. The spread between the buying and the selling rate of rupiah against the US dollar has widened from Rp100 during the first few months of 1997 to more than Rp1500 on February of 1998, reflecting the rise in the risk premium of holding rupiah (Figure 4). Despite the return of political stability in late 2001, the spread rate continued to be wider than the pre-crisis rate.

Another most commonly used measurement to evaluate the uncertainties in the foreign exchange market is the volatility index. To estimate the volatility rates of rupiah, we employ different types of ARCH models. The GARCH specification that we consider takes the form:

$$\ln NER_t = a_0 + a_1 \ln NER_{t-1} + e_t, \text{ where: } e_t \sim N(0, h_t) \quad (1)$$

$$h_t = \alpha + \beta e_{t-1}^2 + \gamma h_{t-1} + u_t. \quad (2)$$

$(\ln NER_t)$ is the nominal exchange rate of rupiah against the US dollar in the log-form. The conditional variance equation (Equation.2) described above is a function of three terms: (1) the mean α ; (2) news about volatility from the previous period, measured as the lag of the squared residual from the mean equation: e_{t-1}^2

(the ARCH term); and (3) the last periods forecast error variance, h_{t-1} (the GARCH term). The test is done on daily rupiah rates from August 1, 1997 to June 12, 2002.

Many different types of ARCH models such as ARCH, GARCH and EGARCH models were estimated on the data. However, only the GARCH(1,1) models are found to be superior in generating the volatility for the rupiah nominal exchange rates against the US dollar.⁶ Consistent with the risk premiums captured by the spread between the buying and the selling rate of rupiah against the US dollar, we find a sharp rise in the volatility rate of rupiah, particularly in 1998 (Figure 5). The average volatility rate from January 1998 to July 1998 was more than four times higher than the average from August 1997 to December 1997. The GARCH(1,1) conditional variance also shows that the volatility rate declined substantially starting 1999. From January 2000 to June 2002, the average volatility rate was only one-fourth of the rate from August 1997 to December 1997. Our test results are consistent with those of McKinnon (2000) and Hernandez and Montiel (2001). Both of these studies have found that after a brief adoption of a floating regime in late 1997 and early 1998, most of the East Asian crisis-affected economies, including Indonesia, have either gone back to the old regime of soft-US dollar pegged policy or sought to stabilize the values of their currencies against the US dollar without adopting any of the strong commitment mechanisms ---this strategy is known as the “hollow middle”.

3.3. *One-month certificate of Bank Indonesia Rate*

As briefly stated in the introduction, one of the big debates on the role of monetary policy in Indonesia during the crisis period is on the desirability of increasing key interest rates to defend the local currency and to manage the growth rate of the base money. At its highest level reported in August 1998, the one-month central bank security (1-month SBI rate) rate went beyond 70 percent (Figure 6).

⁶ The GARCH(1,1) test results can be made available upon request to the author.

Even by the end of the first two years of the 1997 financial crisis, the one-month SBI rate was still hovering at the rate of more than 25 percent. Between June 1999 and April 2000, the one-month rate of the central bank security reported a steady decline and reached its lowest rate at around 11 percent in April 2000. However, the rate has reverted back to a rising trend starting June 2000. In the last 6 months of 2001, the one-month SBI rate has reached an average level of well above 17 percent.

4. Empirics

The objective of this section is to examine the natures of the relationships between the interest rate and the other two key monetary indicators (the exchange rate and the base money). Given the macroeconomic variables discussed above, there is clearly a potential circular reasoning at work. In other words, one needs to investigate a two-way interaction between the relevant variables.⁷ To overcome this we make use of the conventional Granger-causality tests to ascertain the direction of causation. While our interest is in whether rupiah movements and the growth rate of base money are influenced by the changes in the key central bank interest rate, we examine bi-directional Granger-causation for completeness. A general specification of our test in the bi-variate context (X, Y) may be expressed as:

$$\Delta Y_t = \sum_{i=1} \alpha_{1i} \Delta Y_{t-i} + \sum_{i=1} \beta_{1i} \Delta X_{t-i} + \varepsilon_{1t} \quad (3)$$

$$\Delta X_t = \sum_{i=1} \alpha_{2i} \Delta Y_{t-i} + \sum_{i=1} \beta_{2i} \Delta X_{t-i} + \varepsilon_{2t} \quad (4)$$

where: ε_t is a white noise error term and Δ is the first difference operator. All variables are in the log-forms. The Granger-causality test examines the statistical

⁷ For instance, the changes in the domestic interest rate may influence the movements of rupiah, and reciprocally, the fluctuations in the domestic currency could have played a big factor in explaining the changes in the domestic interest rate.

significance of the ΔX_t in explaining ΔY_t (Equation 3) and vice-versa in (Equation 4). To ensure the appropriateness of the granger-causality test, we investigate the unit-root properties of all three monetary variables. We find that all of them are an I(1) series.⁸

4.1. *Exchange Rate and Interest Rate*

Two contrasting sets of views have emerged on the effectiveness of the interest rate policy as a stabilization tool for the domestic currency. The traditional views argue that a tight monetary policy is necessary to support the exchange rate. The rise in the interest rate raises the return that an investor obtains from investing in the country, reduces capital flight and discourages speculation. In contrast, the revisionist views claim that under the unique condition of a financial panic, tight monetary policies and high interest rates would result in capital outflows and exchange rate depreciation. That is high interest rate causes a financial implosion, and raises default possibilities, thus weakening of the currency". (Radelet and Sachs (1998) and Furman and Stiglitz (1998)).

Applying the Granger-Causality test (as shown in equation 3 and 4), we investigate the effectiveness of the changes in the central bank one-month security rate (the 1-month SBI rate) in stabilizing the fluctuations of the local currency. As discussed before, the central bank of Indonesia has been active to try to defend rupiah by raising its SBI rates. Given the availability of daily data on both rupiah and one-month SBI rate, we are able to break our observations into three sets: 1.) the full period: August 1997 - June 2002; 2.) the peak of the crisis period: August 1997 - December 1999; and 3.) the post-crisis observation set (January 2000 - June 2002). Having the three sub-periods, we can conclusively evaluate the effectiveness of the

⁸ For the sake of brevity, the Augmented Dickey-Fuller unit-root test results are not posted in the paper. However, they can be made available upon request to the author.

interest rate policy in limiting the speculative pressures against the local currency.

The results of our tests are posted in Table 3. Three sets of lags are tested (5 days, 15 days and 30 days)⁹. Based on the full sample period and the peak of crisis period, the test statistics robustly indicate that the changes in the SBI interest rate did not have any significant influence on the fluctuations of the rupiah. The F-statistics arrive to the same conclusions using all three different lags. As for the post-crisis period, we do find evidence that the interest rate policy had significant influence (at 10% significant level) on the fluctuations of the rupiah at 30 days lag. However, the result is not robust as it varies when we tried different sets of lags. In fact, when we use 5 and 15 days lag, we find the interest rate to be an insignificant factor. In short, the interest rate policy has failed to stabilize the local currency during the crisis. This finding supports the conclusion of Azis (2001).¹⁰

Interestingly, the results have also shown that during the full crisis period and at the peak of the 1997 financial crisis, the changes in rupiah have significantly granger-caused movements in the one-month SBI rate. These findings capture the policy respond implemented by the monetary authorities to defend the local currency via the interest rate policy.

4.2. *Interest Rate and Base Money*

Another set of the Granger-Causality test is conducted to evaluate the effectiveness of the interest rate policy in absorbing the excess base money in Indonesia. However given the availability of monthly data only, we do not have a large enough degree of freedoms to break the observation set into three sub-periods

⁹ These numbers of lags are chosen to ensure that we have enough degrees of freedom. In any case, we experiment with other lags. But the results do not change. For the reporting purposes, we only show the 30 days lag results.

¹⁰ Azis (2001) shows that the effectiveness of the interest rate policy depends on economic and political risk factors in Indonesia during the 1997 financial crisis. Under high and political risks, rising interest rates only lead to further depreciation of companies' values (and investment) and trigger a higher expectation for further weakening of local currency.

as what we have done earlier. The test result on the full sample covering the period of August 1997 - December 2001 confirmed the ineffectiveness of the interest rate policy as a key instrument in achieving the objective of reducing the base money growth rate (Table 4). No significant F-statistics are reported to indicate any granger-causality relationships between the interest rate and the base money.

5. Bank Restructuring and High Interest Rate

Preceding empirical results have convincingly shown that the active monetary policy intervention in the foreign exchange market and in the money market through various changes in the key SBI rates has not been effective in achieving its targets. Obviously, one must acknowledge other factors that may have explained the ineffectiveness of the interest policy, especially as a measure to stabilize rupiah. Political instability and social unrests for instances have also been blamed for the high volatility of rupiah, particularly during the height of the crisis period. However, despite the ineffectiveness of the interest rate policy, the policy of high interest rate lasted for most of the crisis period. Consequently, this policy has adversely impacted the banking sector heavily. The next sub-section will review few indicators to show negative implications of the high interest rate on the performances of the local banks in general.

5.1. Interest Rate Spread and Profitability.

Looking at Figure 6, it is apparent that the six-month deposit rate follows the movement of the SBI -1 month rate more closely than the lending rate. The granger-causality tests confirm these visual observations (Table 5). Changes in the SBI rate had significantly granger-caused both the lending rate and the deposit rate during the period of August 1997-December 2000. But it is clear from the F-statistics that

the causality effect of the SBI rate is significantly stronger on the deposit rate than on the lending rate.¹¹ The combination of high inflationary pressures and the rising SBI pushed the deposit rate to increase proportionally to ensure the real interest rate to be marginally above zero and to prevent heavy withdrawals of deposits and conversions of rupiah to foreign currencies, particularly during the height of the crisis. The lending/ working capital rate, on the other hand, could not rise as much to prevent further defaults on the loans. Particularly, with rising uncertainties and bankruptcies in key industries in the economy, most local banks had already faced a sharp fall on the demand for working capitals. During most of the crisis period, most of the domestic banks were not able to extend any significant amount of credits to local firms and households due partly to the high interest cost of the loans.

Consequently, as the deposit rate exceeded the lending rate in the early 1998, the domestic banking sector in Indonesia experienced a costly period of negative-interest rate spreads (Figure 6).¹² The rise in the deposit rate implies a rising cost for the bank. In contrast, a higher lending rate means an increasing interest return for the banks. From January 1998 to December 1998, the six-month deposit rate was in average around 7 percent higher than the lending rate. In October 1998, the negative spread was at a staggering rate of 19 percent. The negative spread continued during the first seven months of 1999, with the average spread rate at 2.2 percent.

In turn, the negative spreads further deteriorated the performance of the banking sector. Overall, the banking industry in Indonesia had experienced a total gross loss of as much as Rp178 trillion by December 1998 (Figure 7).¹³ Consistent

¹¹ We apply three different lags (1, 2 and 3 months). The overall conclusions are the same.

¹² The negative spread is calculated by subtracting the deposit rate from the lending rate.

¹³ Given the nominal exchange rate at an average of 1US\$ = Rp7,600 for the month of December 1998, this implies that the banking sector was experiencing a total loss of around US\$ 23.4 billions (before tax).

with the end of negative spread rates in early 2000, the banking industry started to post positive gross profits in 2000 and 2001. Reflecting the improvement in the profitability of the banking industry, the percentage of the gross non-performing loans over the total loans of the banking sector improved to the level of 18 percent at the end of 2000 from the worst level of 50 percent reported between December 1998 and March 1999 (Figure 8).¹⁴

6. Brief Concluding Remarks.

Claessens *et.al* (1999) have argued that given the problem and the level of corporate distress, as well as the continued lack of good governance over the process, the recovery of the banking and corporate sectors, and therefore the recovery of the East Asian economies will take longer time. As briefly discussed, previous papers have highlighted other factors responsible for the slow progress in the restructuring of problem banks in Indonesia. This study evaluated the monetary policy adopted by the government of Indonesia, and found the high interest rate policy, in particular, to have also hampered the progress of the bank restructuring process.

The empirics suggest that the high interest rate policy was an ineffective monetary instrument in dealing with both volatile local currency and rapid growth of base money, particularly during the height of the 1997 financial crisis in 1998 and 1999. Furthermore, the high interest rate policy was responsible for the negative interest spread that had partly caused the overall banking sector to experience a negative profit. From the experience of Indonesia, it is clear that for the monetary policy to be an effective recovery instrument, it must consider and incorporate other macroeconomic objectives in the country, as well as the fragility of the banking and

¹⁴ Given the limited sample observations (and hence degrees of freedom) for the gross profit number and the non-performing loans, we cannot do any regression tests to show statistically

corporate sectors. Furthermore, the political supports are also crucial for any recovery strategies to be successful.

that the negative spread in the interest rate has significantly influenced the performance of the banks.

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Table 1: Recapitalised Bonds

(in Trillion Rupiah)

	Total Bonds	Percentage of Total	Fixed Rate	Variable rate	Hedge
Recapitalised Bonds	435.38	100.00%	180.90	219.48	35.0
State Banks (4)	282.1	64.79%	127.1	120.01	35.0
Private Banks (7)	17.68	4.06%	3.33	14.35	
Others*	135.6	31.15%	50.47	85.12	

Note: Others* includes private banks being taken over by the government, regional development banks.

Source: Bank of Indonesia Data Base

Table 1b: Eleven Main Recapitalised Banks: Bonds and Total Assets

(in Trillion Rupiah)

State Banks				Private Banks			
Banks	Assets	Bonds	Ratio (%)*	Banks	Assets	Bonds	Ratio (%)*
Mandiri	232.6	181.2	78	BCA	96.9	59.6	62
BNI	114.3	61.8	54	Danamon	60.5	47.5	79
BRI	54.0	29.1	54	Niaga	17.6	9.5	54
BTN	20.5	9.8	48	BII	40.1	6.5	16
				Lippo	21.8	6.0	28
				Bali	5.7	5.3	94
				Universal	11.3	4.2	37

Source: Dick (2001), Note: * The ratio captures the percentage share of the bonds on the overall assets of the banks.

**Table 2: Schedule of Phase-Out of Government Blanket Guarantee
(As of August 2002)**

Effective Date	Type of Guarantee Items Terminated
<p><u>First Stage:</u> 6 months after its formal announcement</p>	<ol style="list-style-type: none"> 1. On Balance Sheet: <ol style="list-style-type: none"> a). Cash Collateral b). Import Facilities c). Securities, e.g. Bonds, etc 2. Off Balance Sheet: <ol style="list-style-type: none"> a). Import Transactions, e.g. L/C (Letter of Credits) and standby L/C, etc. b). Bank Guarantee c). Currency Swap d). Local Letter of Credit
<p><u>Second Stage:</u> 12 months after</p>	<ol style="list-style-type: none"> 1. Inter-bank Loans 2. Third Party Funds, e.g. deposits, CD, and On Call Deposits above Rp 5 billion.
<p><u>Third Stage:</u> 18 months after</p>	<ol style="list-style-type: none"> 1. Third Party Funds above Rp 100 million 2. Establishing Limited Deposit Insurance up to Rp 100 million.

Source: Bisnis Indonesia (daily newspaper) and Indonesian Rupiah Bond Weekly (Citibank and Solomon Smith Barney)

Table 3: Granger-Causality Test (Rupiah and 1-month SBI rate)

(All variables in the log-forms (ln), Δ is the first difference operator)

I. Full Period: Daily observations, August 1997 – June 2002

Null Hypothesis	Observation	F-Statistics	Probability
$\Delta \ln \text{SBI}$ doesn't Granger-Cause $\Delta \ln \text{rupiah}$	1260 (lags = 30)	0.9104	0.6064
$\Delta \ln \text{rupiah}$ doesn't Granger-Cause $\Delta \ln \text{SBI}$	1260 (lags = 30)	5.4598	0.0000

II. Peak of the Crisis: Daily Observations, August 1997 – December 1999

Null Hypothesis	Observation	F-Statistics	Probability
$\Delta \ln \text{SBI}$ doesn't Granger-Cause $\Delta \ln \text{rupiah}$	580 (lags = 30)	0.4886	0.9905
$\Delta \ln \text{rupiah}$ doesn't Granger-Cause $\Delta \ln \text{SBI}$	580 (lags = 30)	2.7223	0.0000

III. Post-Crisis: Daily Observations, January 2000 – June 2002

Null Hypothesis	Observation	F-Statistics	Probability
$\Delta \ln \text{SBI}$ doesn't Granger-Cause $\Delta \ln \text{rupiah}$	630 (lags = 30)	1.3958	0.0807
$\Delta \ln \text{rupiah}$ doesn't Granger-Cause $\Delta \ln \text{SBI}$	630 (lags = 30)	1.1891	0.2269

Table 4: Granger-Causality Test (Base Money (M0) and 1-month SBI rate)

(All variables are in the log-forms (ln), Δ is the first difference operator)

Full Period: Monthly Observations, August 1997 – December 2001

Null Hypothesis	Observation	F-Statistics	Probability
$\Delta \ln M0$ doesn't Granger-Cause $\Delta \ln SBI$	55 (lags = 3)	2.0777	0.1161
$\Delta \ln SBI$ doesn't Granger-Cause $\Delta \ln M0$	55 (lags = 3)	1.3502	0.2698

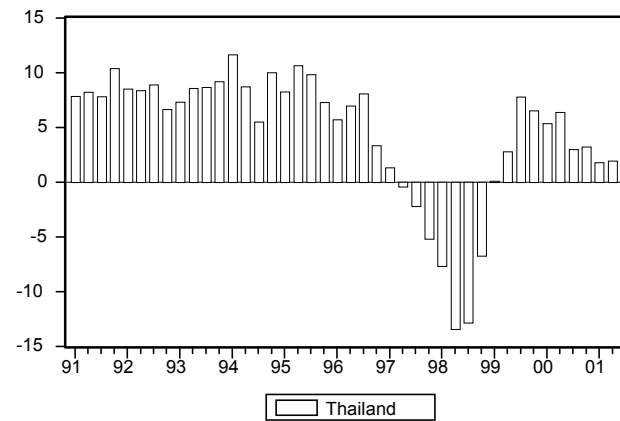
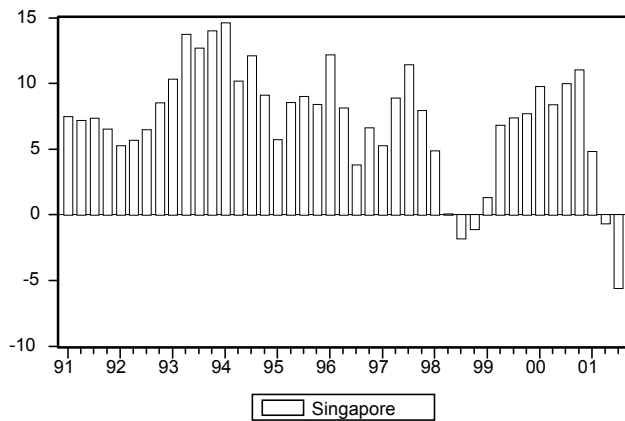
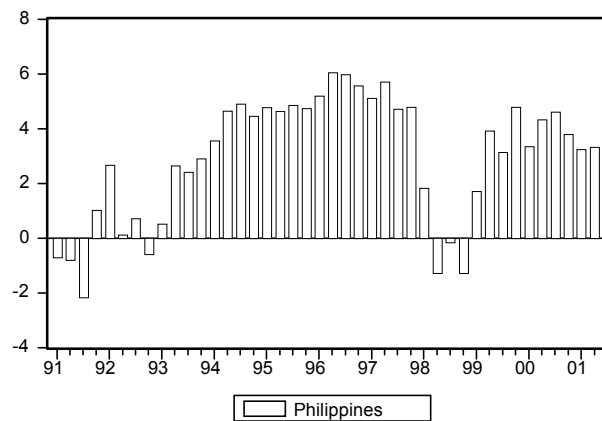
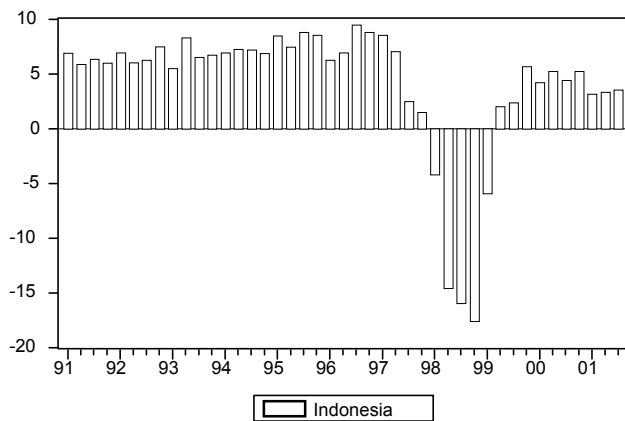
**Table 5: Granger-Causality Test
(1-month SBI rate, 6-month Deposit rate and Lending rate)**

(All in the log-forms (ln), Δ is the first difference operator)

Full Period: Monthly Observations, August 1997 – December 2001

Null Hypothesis	Observation	F-Statistics	Probability
$\Delta \ln \text{Deposit}$ doesn't Granger-Cause $\Delta \ln SBI$	41 (lags = 3)	0.1869	0.9048
$\Delta \ln SBI$ doesn't Granger-Cause $\Delta \ln \text{Deposit}$	41 (lags = 3)	11.4148	0.0000
$\Delta \ln \text{Lending}$ doesn't Granger-Cause $\Delta \ln SBI$	41 (lags = 3)	0.0102	0.9985
$\Delta \ln SBI$ doesn't Granger-Cause $\Delta \ln \text{Lending}$	41 (lags = 3)	3.5617	0.0253

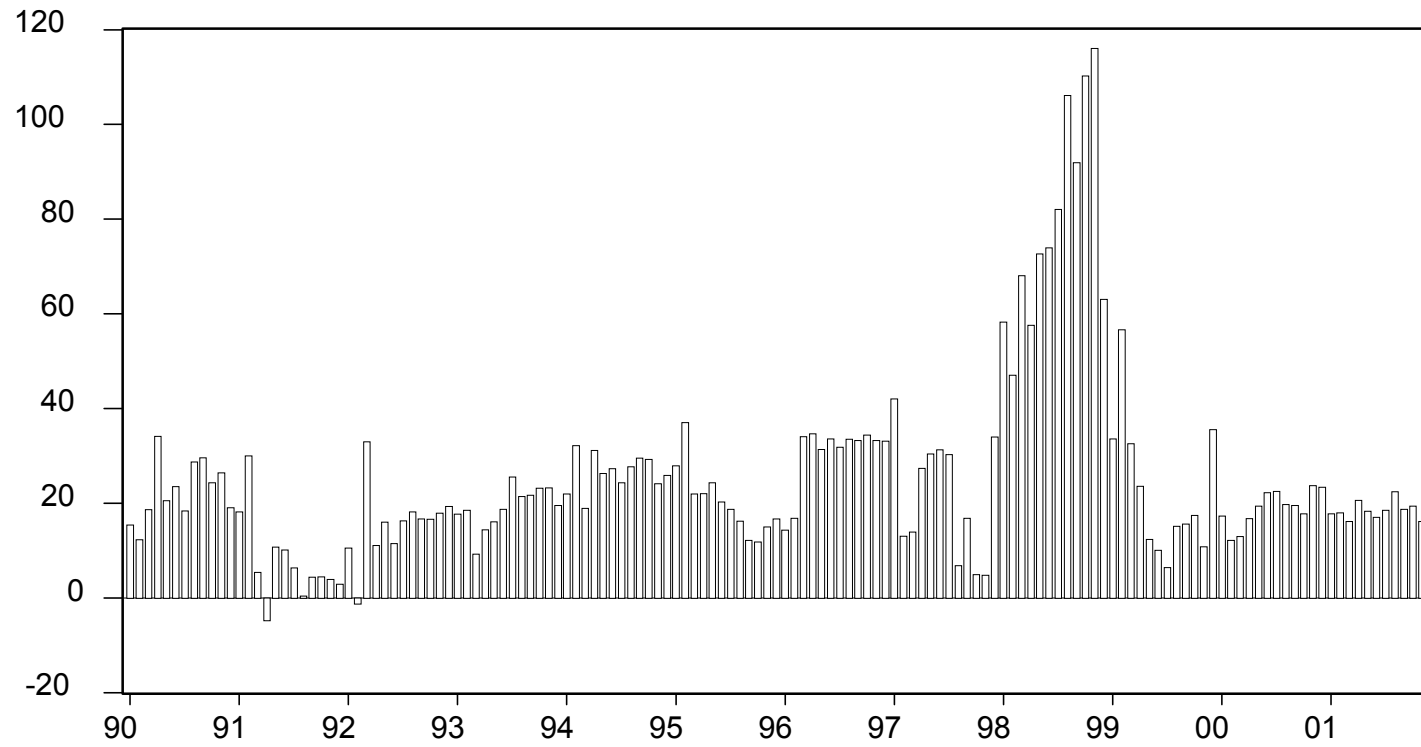
Figure 1: Annual GDP Growth Rates (in %) of Selected Economies in Southeast Asia



Source: CEIC Data Base

Figure 2: Growth Rate of Base Money (Year on Year)

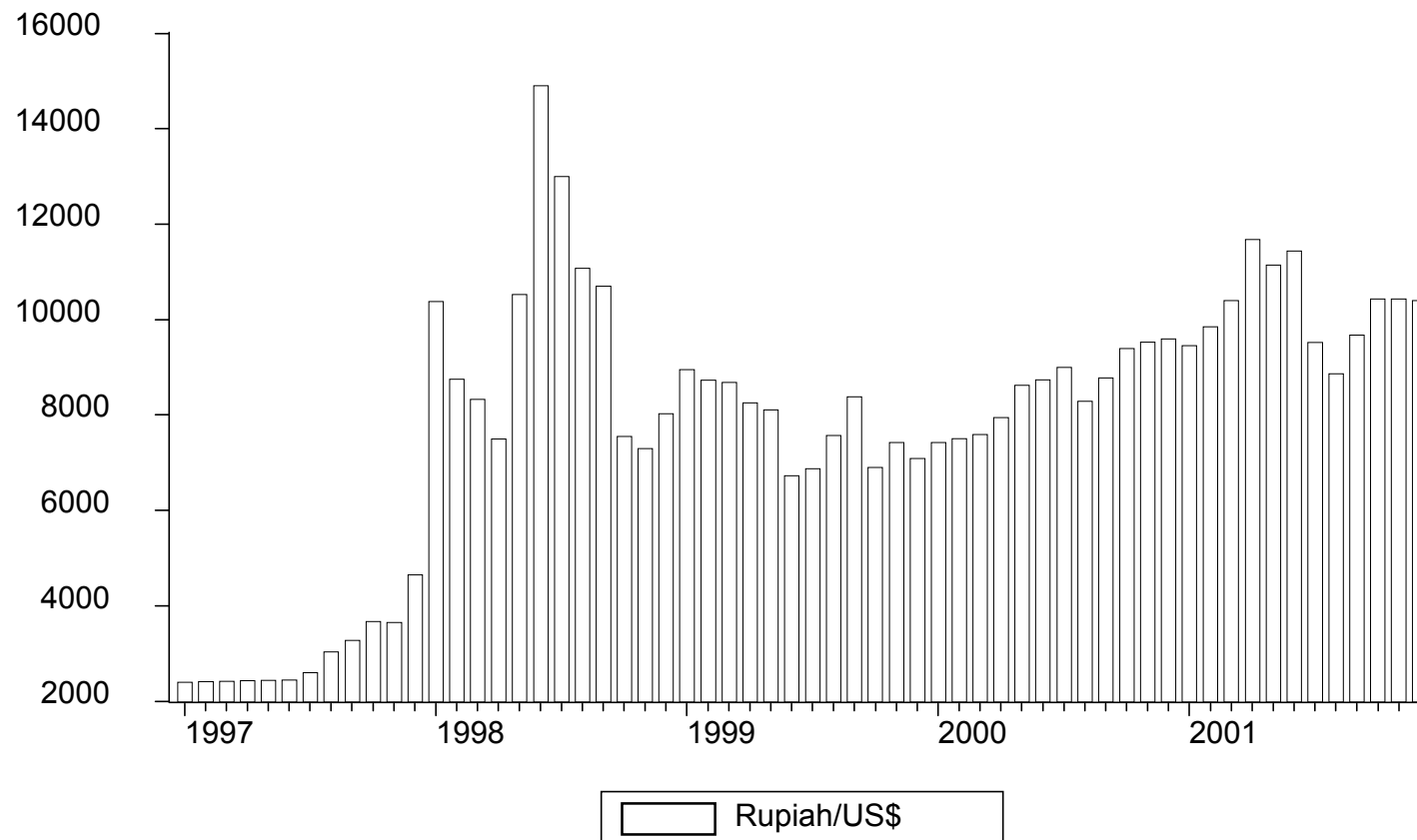
(January 1990 - December 2001)



Source: Bank Indonesia Data Base

Figure 3: Nominal Exchange Rate of Rupiah Against the US dollar

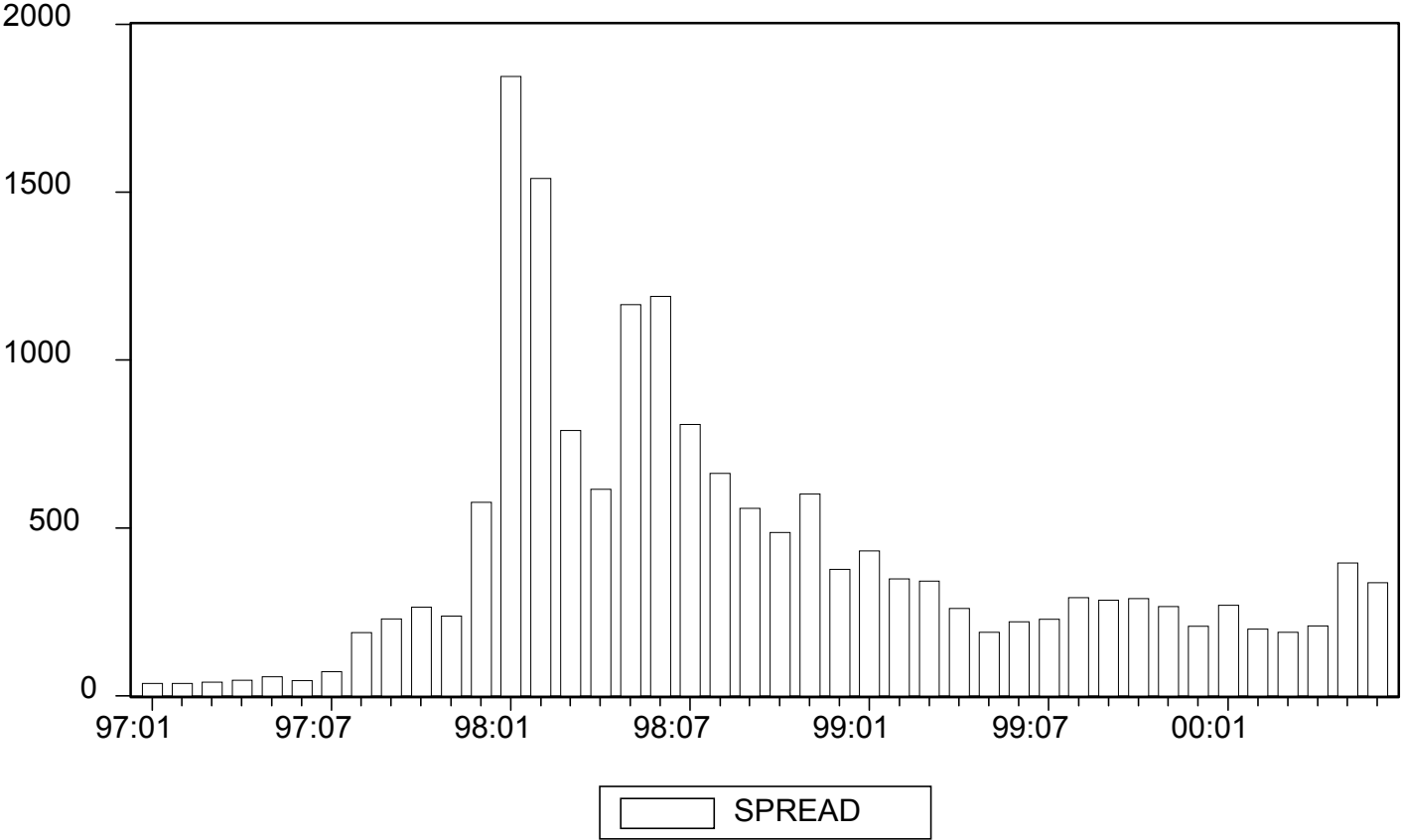
(January 1997 - December 2001)



Source: International Financial Statistics, IMF (various years)

Figure 4: Spread Between Selling and Buying Exchange Rate of Rupiah Against the US dollar

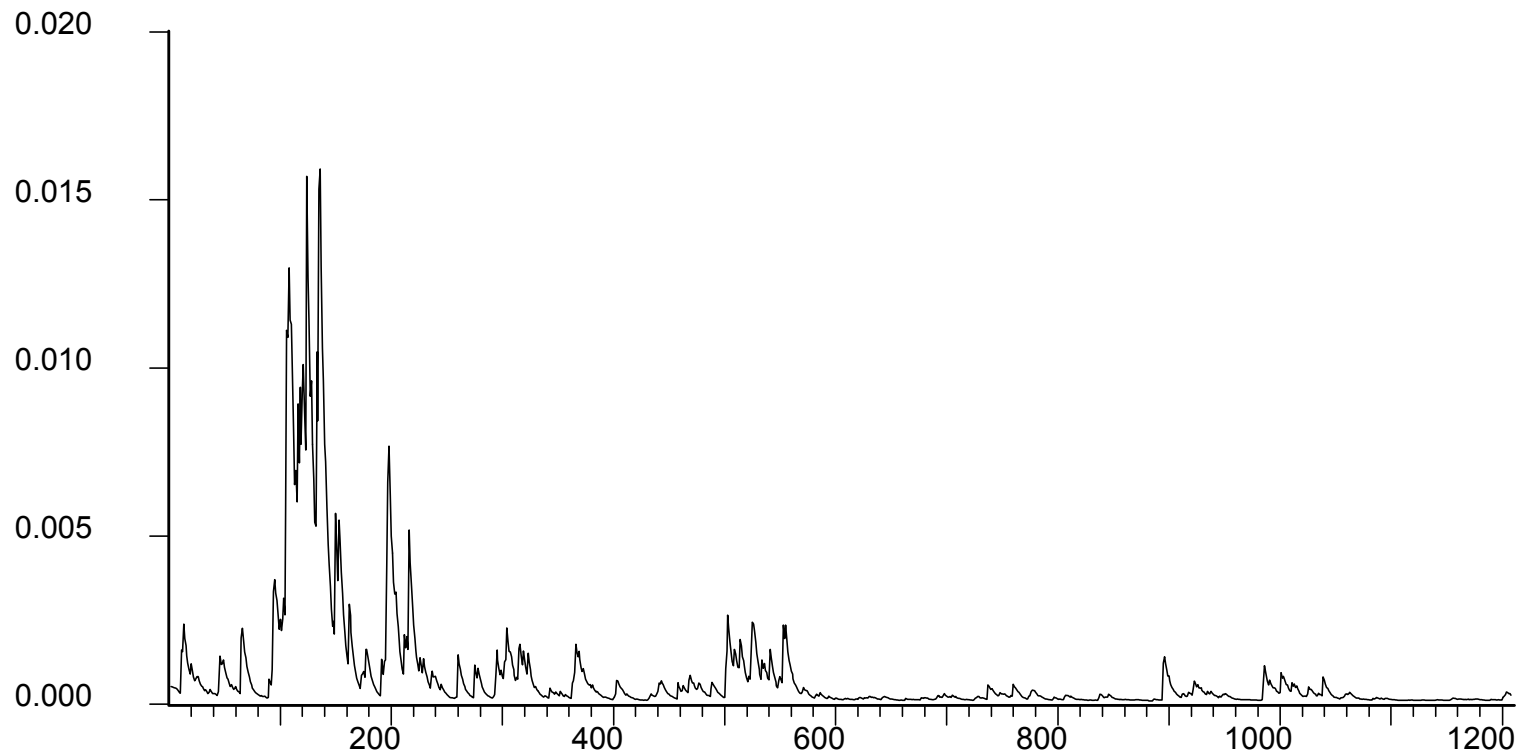
(January 1997 - June 2001 in Unit of Rupiah)



Source: Central Bureau of Statistics, Indonesia

Figure 5: GARCH(1,1) Volatility Rate of Rupiah Against the US dollar

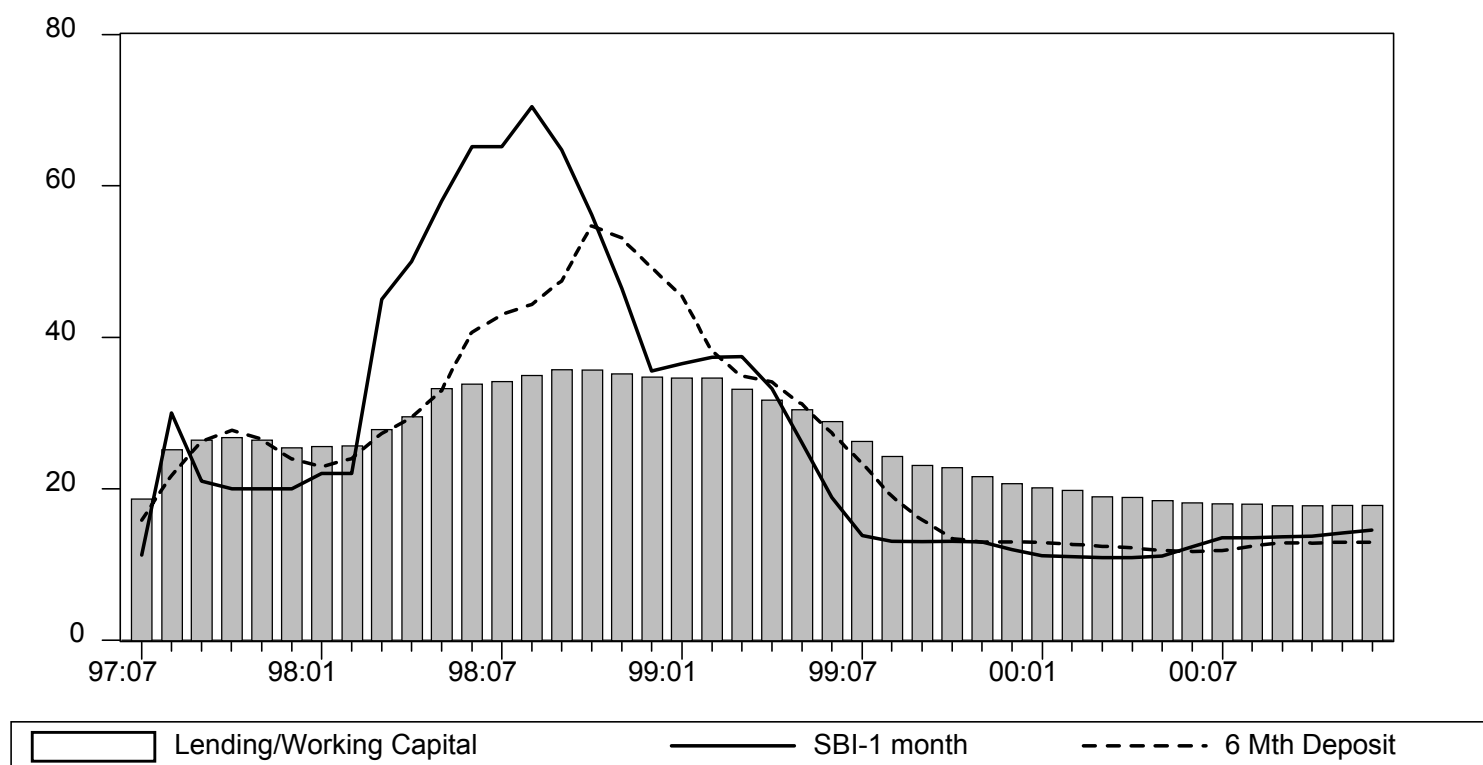
(Daily Observations from August 1, 1997 – June 12, 2002)



Note: The horizontal axis represents the daily observation starting August 1, 1997 as the first observation until June 12, 2002 exchange rate as the last observation set. The results are based on the author's own calculation.

Figure 6: Interest Rate Spread (Working Capital Rate and 6-Month Deposit Rate) and the SBI-1 month

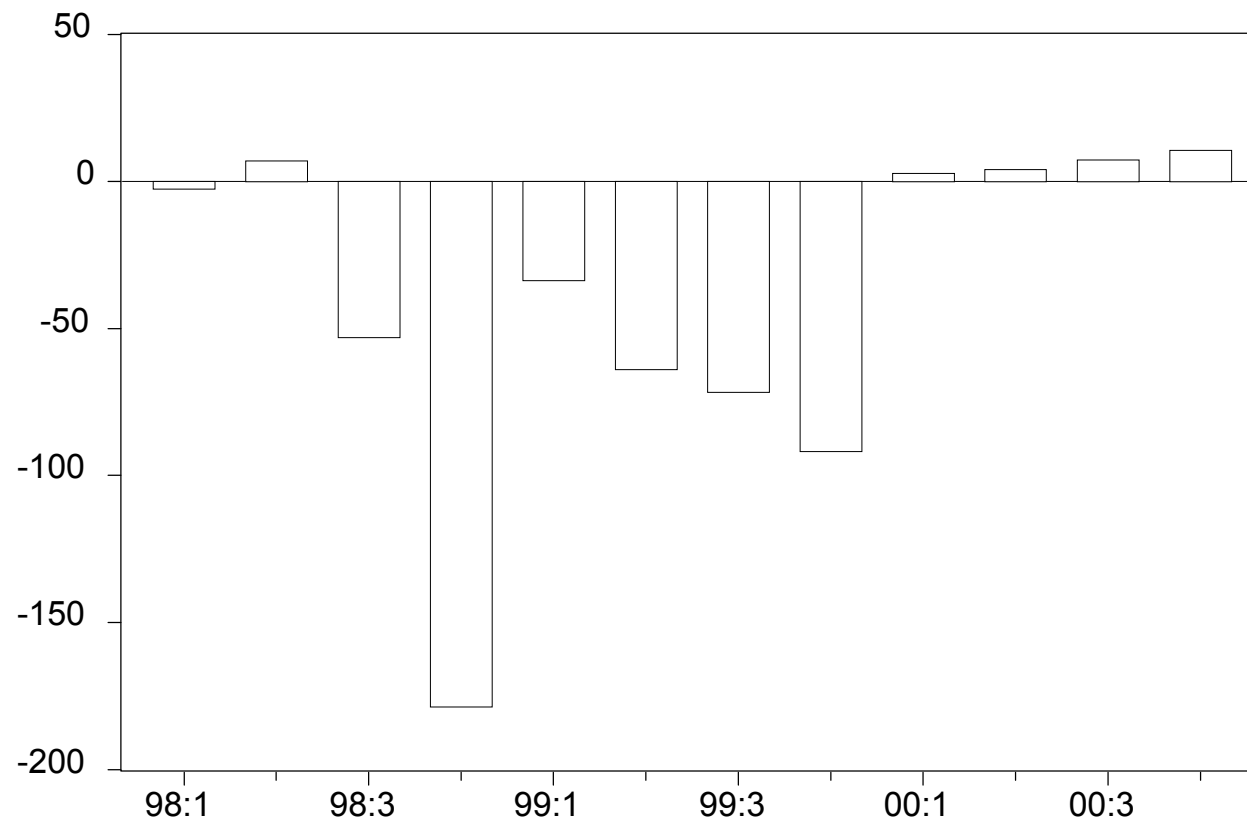
(July 1997 - December 2000)



Source: International Financial Statistics, IMF (various years), and Bank Indonesia Data Base

Figure 7: Profit Before Tax

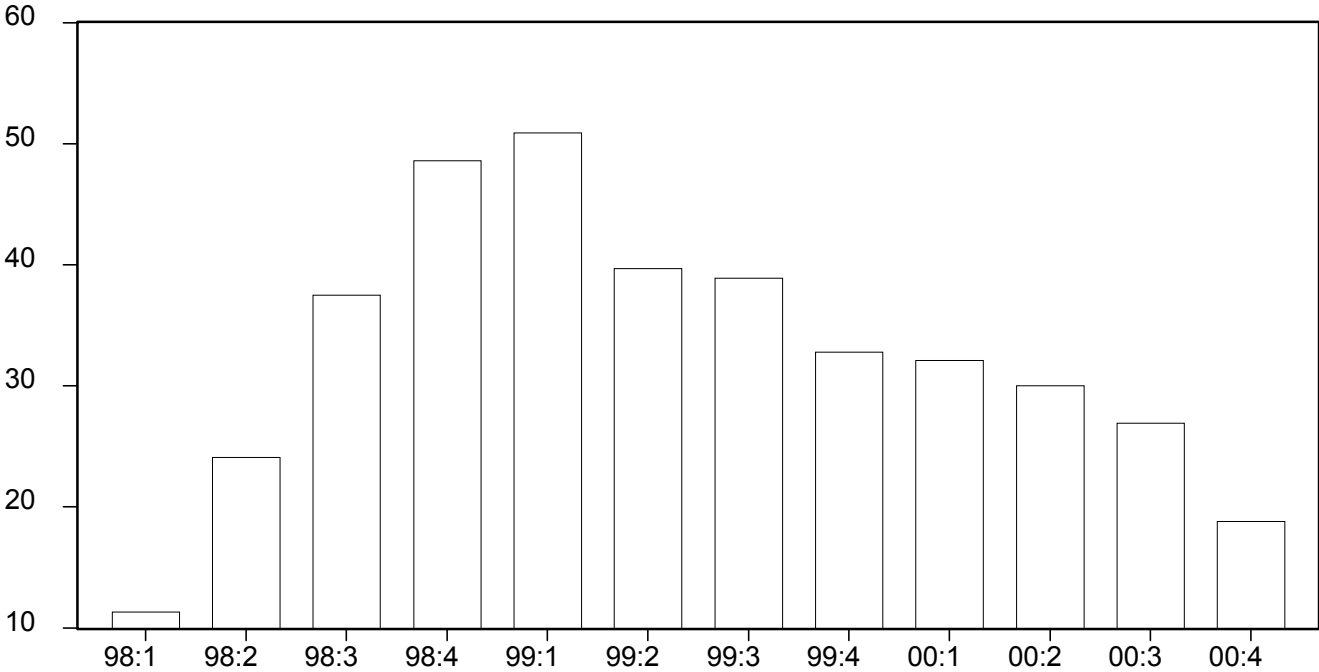
(in Trillion of Rupiah)



Source: Bank Indonesia Data Base

Figure 8: Gross Non-Performing Loans

(in % of total loans)



Source: Bank Indonesia Data Base